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(पहला पुनरीक्षण)

Indian Standard

STRANDED WIRE ROPES FOR MINE HOISTING — TECHNICAL DELIVERY REQUIREMENTS

(First Revision)

ICS 73 100 40

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 2003 **Price Group 5**

Wire Ropes and Wire Products Sectional Committee, ME 10

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Wire Ropes and Wire Products Sectional Committee had been approved by the Mechanical Engineering Division Council

This standard was first published in 1994 by adopting ISO 3154 1988 'Stranded wire ropes for mine hoisting — Technical delivery requirements' issued by the International Organization for Standardization Necessity has been felt to revise the standard by incorporating requirement of lower limits tolerance for tensile strength after rope making Due to this modification, ISO 3154 1988 cannot be continued adoption in its original form Therefore, this standard has been published without dual numbering in this revision However, there is no change in the technical content of this revised standard to that of ISO 3154 1988 except the above modification, requirement on nominal diameters of round wires from rope and the reference to the equivalent National Standards given in place of reference to the ISO standards given in earlier dual numbered edition

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 1960 'Rules for rounding off numerical values (*revised*)' The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard

AMENDMENT NO. 1 APRIL 2008
TO
IS 13917 : 2003 STRANDED WIRE ROPES FOR MINE HOISTING — TECHNICAL DELIVERY REQUIREMENTS

(First Revision)

(*Page* 1, *clause* **4.1.1.2**, *first sentence*) — Substitute the following for the existing:

'The actual rope diameter measured on the newly completed rope in the unloaded state shall be within $^{+4}_{-1}$ percent of the nominal diameter.'

(ME 10)

Reprography Unit, BIS, New Delhi, India

Indian Standard

STRANDED WIRE ROPES FOR MINE HOISTING — TECHNICAL DELIVERY REQUIREMENTS

(First Revision)

1 SCOPE

This standard specifies those properties of stranded wire ropes for mine hoisting and of their component parts which form a basis for acceptance Full-lock coil ropes, balance ropes and flat ropes used in mines are not covered by this standard

The characteristics of the wire to be used for the manufacture of these ropes, namely, the wires before rope making are not covered by this standard

2 REFERENCES

The following standards contain provisions, which through reference in this text constitute provisions of this standard At the time of publication, the editions indicated were valid All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below

IS No	*Title*
1608 1995	Mechanical testing of metals—Tensile testing (*second revision*)
1716 1985	Method for reverse bend test for metallic wire (*second revision*)
1717 1985	Method for simple torsion testing of wire (*second revision*)
1804 1996	Steel wire ropes—Fibre main cores — Specification (*third revision*)
2363 1981	Glossary of terms relating to wire ropes (*first revision*)
6745 1972	Method for determination of mass of zinc coating on zinc coated iron and steel articles
9182	Lubricants for wire ropes and fibre cores — Specification
(Part 1) 1993	Lubricants for fibre core of wire ropes (*first revision*)
(Part 2) 1993	Lubricants for wire strands and ropes (*first revision*)
(Part 3) 1993	Lubricants for rope dressing in services (*first revision*)

3 COMPONENTS OF THE ROPE

3.1 Wires

Stranded wire ropes for hoisting purposes shall be made from round wires[1] These shall be either bright or galvanized The requirements for wires after manufacture are given in **4**

3.2 Fibre

Fibre cores, fibre covers and fibre inserts used in the manufacture of these ropes shall comply with the requirements laid down in IS 1804

3.3 Lubricants

The impregnating compounds and lubricants used during manufacture of these ropes shall comply with the requirements laid down in IS 9182 (Parts 1, 2 and 3) as applicable

4 REQUIREMENTS

4.1 Requirements for the Completed Rope

4.1.1 *Rope Diameter*

4.1.1.1 *Nominal rope diameter*

The nominal diameter shall be agreed between the manufacturer or supplier and the purchaser when the rope is ordered

4.1.1.2 *Actual rope diameter*

The actual rope diameter measured on the newly completed rope in the unloaded state shall be not less than the agreed nominal rope diameter and shall not exceed it by more than 5 percent The actual rope diameter shall be measured by the method laid down in **5.1.1**

4.1.2 *Rope Length*

4.1.2.1 *Nominal length*

The nominal length shall be agreed between the manufacturer or supplier and the purchaser when the rope is ordered Any test pieces shall be included in the ordered length

4.1.2.2 *Actual rope length*

The actual rope length measured on the newly completed rope in the unloaded state shall be subject to the following tolerances on the ordered length

---

[1] In ropes of triangular or flattened strand construction shaped wires may be used as core members

a) Up to and including 400 m $^{+5}_{0}$ percent

b) Over 400 m up to 1 000 m $^{+2}_{0}$ percent

c) For each further 1 000 m or part thereof $^{+20}_{0}$ m

The actual rope length shall be determined by the method agreed according to **5.1.2**

4.1.3 *Rope Mass per Metre*

4.1.3.1 *Nominal rope mass*

The nominal rope mass per metre and the tolerances shall be agreed between the manufacturer or supplier and the purchaser when the rope is ordered

4.1.3.2 *Actual rope mass*

The actual rope mass measured on the newly completed rope in the unloaded state shall not differ from the agreed nominal rope mass by less than 2 percent or more than +5 percent and shall be determined by the method laid down in **5.1.3**

4.1.4 *Breaking Forces*

4.1.4.1 *General*

Two methods of assessment are recognized Compliance with one or the other shall be agreed between the manufacturer or supplier and the purchaser The definitions of breaking forces shall be those given in IS 2363

4.1.4.2 *Method A*

In this method, the terms used are 'nominal aggregate breaking force' and 'measured aggregate breaking force[1]'

a) *Nominal aggregate breaking force*—The nominal aggregate breaking force shall be agreed between the manufacturer or supplier and the purchaser when the rope is ordered [2]

b) *Measured aggregate breaking force*—The measured aggregate breaking force shall not be less than the nominal aggregate breaking force[3] It shall be determined by the method laid down in **5.1.4.1**

4.1.4.3 *Method B*

In this method, the terms used are 'minimum breaking force' and 'measured breaking force'

a) *Minimum breaking force*—The minimum breaking force shall be agreed between the manufacturer or supplier and the purchaser when the rope is ordered

b) *Measured breaking force*—The measured breaking force shall not be less than the minimum breaking force[3] It shall be determined by a tensile test to destruction carried out in the manner specified in **5.1.4.2** on a sample of the rope

4.2 Requirements for Round Wires from Rope

4.2.1 *Wire Diameter*

4.2.1.1 *Nominal diameter*

The intervals separating successive nominal diameters for bright and galvanized wires are given in Table 1 The diameter of galvanized wires shall be measured over the galvanized coating

Table 1 Intervals of Successive Nominal Diameters

All dimensions in millimetres

Sl No	Nominal Diameter d	Intervals
(1)	(2)	(3)
i)	$d < 2$	0.01
ii)	$d > 2$	0.02

If for technical reasons, the nominal diameters of the wires differ from these values, the nominal diameters of the wires shall be indicated by the manufacturer or supplier in the confirmation of the order to the rope purchaser and in the full woks certificate (*see* **7.3**)

4.2.1.2 *Tolerances*

For bright and galvanized wires, the tolerances on the diameter shall be as given in Table 2

Galvanized wires may owing to local irregularities, exceed the tolerances laid down in Table 2 over a short length provided that the use of the wires is not affected

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[1] It is the practice in some countries to disregard certain components of the rope when assessing the nominal aggregate and the measured aggregate breaking force, the value determined in this way is called a reduced aggregate (nominal or measured) breaking force of the rope National standards and regulations may specify those components The components which have to be disregarded may be agreed between the manufacturer or supplier and the purchaser

The reduced nominal and the reduced measured aggregate breaking forces may form a basis for acceptance of the rope

[2] The minimum breaking force may also be agreed between the manufacturer or supplier and the purchaser in this case the minimum breaking force is calculated from the nominal aggregate breaking force and an agreed spinning loss factor

[3] In special cases, it may be necessary for the upper limit of breaking force to be the subject of agreement between the manufacturer or supplier and the purchaser

Table 2 Tolerances on Nominal Diameters

(*Clause* 4.2.1.2)

All dimension and tolerances in millimetres

Sl No.	Nominal Diameter of Wire, *d*	Tolerance On	
		Bright and Quality B[1] Galvanized Wire	Quality A[1] Galvanized Wire
(1)	(2)	(3)	(4)
i)	$0.8 \le d < 1$	±0.02	±0.03
ii)	$1 \le d < 1.6$	±0.02	±0.04
iii)	$1.6 \le d < 2.4$	±0.03	±0.05
iv)	$2.4 \le d \le 3.5$	±0.03	±0.06

[1] *See* **4.2.6.1**

4.2.2 *Tensile Strength*

4.2.2.1 *Nominal tensile strength*

The nominal tensile strength values (tensile grades) for wires shall be as given in Table 3 They shall be agreed between the manufacturer or supplier and the purchaser when the rope is ordered.

These nominal values are the lower limits for tensile strengths before rope making The upper limits are equal to the lower limits plus the tolerances given in **4.2.2.2**

If, in exceptional cases, other nominal tensile strengths are necessary, these and the relevant technical requirements shall be agreed between the manufacturer or supplier and the purchaser

For lower limits of tensile strength after rope making the respective nominal values as shown in the Table 3 or any other nominal tensile grades agreed between the manufacturer or supplier and the purchaser shall be reduced by 50 N/mm^2

Table 3 Nominal Tensile Strength Values

(*Clause* 4.2.2.1)

Nominal Tensile Strength (Tensile Grade) N/mm^2
1 570
1 770
1 960

4.2.2.2 *Tolerances*

The upper limit tolerances for nominal tensile strength shall be as given in Table 4.

4.2.3 *Number of Reverse Bends*

The minimum number of reverse bends shall be in accordance with Table 5.

Table 4 Upper Limit Tolerances for Nominal Tensile Strength

(*Clause* 4.2.2.2)

Sl No.	Nominal Diameter of Wire, *d* mm	Upper Limit Tolerances for Nominal Tensile Strength N/mm^2
(1)	(2)	(3)
i)	$0.8 \le d < 1$	350
ii)	$1 \le d < 1.5$	320
iii)	$1.5 \le d < 2$	290
iv)	$d \ge 2$	260

4.2.4 *Number of Torsions*

The minimum number of torsions shall be in accordance with the values specified in Table 6

4.2.5 *Elongation of Wire*

The elongation of wire shall be measured on a gauge length of 200 mm meeting the following requirements·

a) ≤ 2.00 mm 1.3%

b) ≥ 2.00 mm 1.8%

4.2.6 *Zinc Coating*

4.2.6.1 *Qualities*

Two grades of galvanizing shall be recognized these are Quality A (heavy galvanizing) and Quality B (normal galvanizing)

4.2.6.2 *Assessment*

The quality of the galvanized coating shall be assessed by the mean mass of zinc deposited per unit area of surface, in grams per square metre

The zinc coating shall comply with the values given in Table 7

The values given in the column for Quality A are not applicable for tensile grades exceeding 1 770 N/mm^2 For higher tensile grades, values shall be agreed between the manufacturer or supplier and the purchaser

For shaped strand ropes with more than one layer of round wires in the strands, the values given in Table 6 shall be reduced by one torsion each

For shaped strand ropes with only one layer of round wires in the strands, the values given in Table 6 shall be reduced by two torsions each

4.3 Requirements for Shaped Wires from Rope

If shaped wires from strand cores contribute an essential part of the breaking strength of the rope, the extent of the tests, the requirements and the methods of testing shall be as agreed to between the manufacturer or the supplier of the rope and the purchaser

Table 5 Minimum Number of Reverse Bends

(*Clause* 4 2 3)

Nominal Diameter of Wire, d	**Radius of Cylindrical Formers**	**Minimum Number of Reverse Bends When Acceptance Method A is Used**					**Reduction Applicable on Bending Numbers When Acceptance Method B is Used**
		Bright and Quality B Galvanized Wire			Quality A Galvanized Wire		
		Nominal Tensile Strength, N/mm^2					
mm (1)	mm (2)	1 570 (3)	1 770 (4)	1 960 (5)	1 570 (6)	1 770 (7)	(8)
$0\ 8 \le d < 0\ 9$	2 5	13	12	11	10	9	3
$0\ 9 \le d < 1$		12	11	10	9	8	
$1 \le d < 1\ 1$	3 75	17	16	15	14	13	4
$1\ 1 \le d < 1\ 2$		15	14	13	12	11	
$1\ 2 \le d < 1\ 3$		13	12	11	10	9	
$1\ 3 \le d < 1\ 4$		12	11	10	9	8	
$1\ 4 \le d < 1\ 5$		11	10	9	8	7	3
$1\ 5 \le d < 1\ 6$	5	14	13	12	11	10	
$1\ 6 \le d < 1\ 7$		13	12	11	10	9	2
$1\ 7 < d < 1\ 8$		12	11	10	9	8	
$1\ 8 \le d < 1\ 9$		11	10	9	8	7	
$1\ 9 \le d < 2$		10	9	8	7	6	
$2 \le d < 2\ 1$	7 5	15	14	13	12	11	3
$2\ 1 \le d < 2\ 2$		14	13	12	11	10	
$2\ 2 \le d < 2\ 3$		13	12	11	10	9	
$2\ 3 < d < 2\ 4$		13	12	11	10	9	
$2\ 4 \le d < 2\ 5$		12	11	10	9	8	
$2\ 5 \le d < 2\ 6$		11	10	9	8	7	2
$2\ 6 \le d < 2\ 7$		10	9	8	7	6	
$2\ 7 \le d < 2\ 8$		10	9	8	7	6	
$2\ 8 \le d < 2\ 9$		9	8	7	6	5	
$2\ 9 \le d < 3$		9	8	7	6	5	
$3 \le d < 3\ 1$	10	12	11	10	9	8	
$3\ 1 \le d < 3\ 2$		12	11	10	9	8	
$3\ 2 \le d < 3\ 3$		11	10	9	8	7	
$3\ 3 \le d < 3\ 4$		11	10	9	8	7	
$3\ 4 \le d \le 3\ 5$		10	9	8	7	6	

5 TESTING

5.1 Tests on the Completed Rope

5.1.1 *Determination of Rope Diameter*

The actual diameter of the rope shall be measured with a suitable caliper fitted with jaws broad enough to cover not less than two adjacent strands

Measurements shall be taken on a straight portion of the rope under no-load condition

The measurements shall be taken at two points spaced at least 1 m apart; at each point two diameters at right angles shall be measured. The average of these four measurements shall be taken as being the actual diameter. It shall be within the tolerance specified by reference to the nominal diameter The maximum variation between any of the four measurements shall not exceed 4 percent of the nominal rope diameter. In case of dispute, the diameter may be measured under a load not exceeding 5 percent of the nominal breaking force of the rope

5.1.2 *Determination of Rope Length*

The method of measuring the rope length shall be agreed between the manufacturer or supplier and the purchaser.

Table 6 Minimum Number of Torsions

(*Clauses* 4.2.4 *and* 4.2.6.2)

Test Length	**Nominal Diameter of Wire, *d***	**Minimum Number of Torsions**[1]				
		Bright and Quality B Galvanized Wire			Quality A Galvanized Wire	
		Nominal Tensile Strength, N / mm^2				
mm	mm	1 570	1 770	1 960	1 570	1 770
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$0\ 8 \leq d < 1$	33	31	25	21	19
	$1 \leq d < 1\ 3$	31	29	24	19	17
	$1\ 3 \leq d < 1\ 8$	30	27	23	18	16
$100 \times d$	$1\ 8 \leq d < 2\ 3$	28	26	21	17	14
	$2\ 3 \leq d < 3$	26	23	19	14	11
	$3 \leq d < 3\ 4$	24	21	18	9	7
	$3\ 4 \leq d \leq 3\ 5$	22	19	16	8	6

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[1] The torsion values apply to round strand ropes

Table 7 Requirement of Zinc Coating

(*Clause* 4 2 6.2)

Sl No	**Nominal Diameter of Wire, *d*, mm**	**Minimum Surface Density of Zinc, g/m^2**	
		Quality A	Quality B
(1)	(2)	(3)	(4)
i)	$0\ 8 \leq d < 1$	130	70
ii)	$1 \leq d < 1\ 2$	150	80
iii)	$1\ 2 \leq d < 1\ 5$	165	90
iv)	$1\ 5 \leq d < 1\ 9$	180	100
v)	$1\ 9 < d < 2\ 5$	205	110
vi)	$2\ 5 < d < 3\ 2$	230	125
vii)	$3\ 2 \leq d \leq 3\ 5$	250	135

The rope length shall be measured, in metres, with an accuracy of at least ± 2 5 percent.

5.1.3 *Determination of Rope Mass*

The mass of the rope including reels and packing material, shall be determined in kilograms. The mass of reels, slings and packing shall be subtracted from this value to give the total rope mass The total rope mass shall be divided by the measured rope length. The actual rope mass, in kilograms per metre shall be within the tolerances specified in **4.1.3.2.**

5.1.4 *Determination of Breaking Forces*

5.1.4.1 *Measured aggregate breaking force*

If acceptance Method A is agreed (*see* **4.1.4.2**), the measured (actual) aggregate breaking force of the rope shall be found by adding together the breaking forces of all the individual wires from the rope, after they have been tested as specified in **5.2.3**

The reduced measured aggregate breaking force shall be determined, if so specified (*see* Footnote 1 under **4.1.4.2**)

5.1.4.2 *Measured breaking force*

5.1.4.2.1 *General*

If acceptance Method B is agreed (*see* **4.1.4.3**), the measured (actual) breaking force of the rope shall be determined as indicated in **5.1.4.2.2** to **5.1.4.2.7**

5.1.4.2.2 *Test length*

The length of the test piece is made up of the clear test length and an adequate allowance for gripping.

The clear test length shall be equal to at least 30 times the rope diameter, but not less than 1 5 m

5.1.4.2.3 *Test piece*

The test piece shall be representative of the rope as a whole and free from any defect. The test piece, before being cut from the rope, shall be served or clamped securely so as to prevent any slackening of the wires within the test length The rope from which the test piece is taken shall be secured in the same way. Test pieces showing slack wires or other defects shall not be tested.

For testing the rope to destruction, it is useful to provide the ends of the test piece with conical sockets. Care shall be taken to ensure that the casting material penetrates well into the untwisted ends of the test piece. Other methods of fixing the rope ends may be agreed between the manufacturer or supplier and the purchaser

5.1.4.2.4 *Testing machine*

A testing machine of suitable capacity and of an accuracy of ±1 percent, that is, certified periodically by an officially recognized testing authority shall be used.

The sample shall be gripped in such a way that all wires in the rope take part in the acceptance of the force.

The test shall be carried out at a testing station agreed by the manufacturer or supplier and the purchaser.

5.1.4.2.5 *Performance of test*

Not more than 80 percent of the nominal breaking force may be applied quickly Thereafter, the force shall be applied slowly and steadily, at a rate not exceeding 10 N/(mm^2 s), until the maximum force is attained.

5.1.4.2.6 *Place of fracture*

Tests in which fracture occurs less than two rope diameters away from the grips may be discounted at the option of the manufacturer or supplier

5.1.4.2.7 *Recording of elongation*

This shall be the subject of special agreement between the manufacturer or supplier and the purchaser If required, the elongation shall be measured over a test length of at least 500 mm Elongation readings shall be taken commencing at a force equal to 2 percent of the nominal breaking force and thereafter at 10, 20, 30, 50 and 60 percent of the minimum breaking force unless continuous recording is available

In the case where incremental readings are taken, the permanent elongation shall be determined after each measurement by reducing the test force to 2 percent of the minimum breaking force and recording the elongation The elongation shall be measured to an accuracy of 0 1 mm.

5.2 Test on Wires from the Rope

5.2.1 *Extent of Tests*

5.2.1.1 *Using acceptance Method A* (*see* **4.1.4.2**)

All tests, with the exception of the test for the galvanized coating, shall be performed on all the round[1] steel wires in the rope

In order to obtain test pieces, a suitable length shall be cut from the rope and the wires unlaid The galvanized coating tests shall be carried out on 10 percent of all the round wires[1].

The samples shall be taken at random

5.2.1.2 *Using acceptance Method B* (*see* **4.1.4.3**)

The number of wires of each nominal diameter taken for test from the rope shall be at least 16 percent of the total number of wires of that nominal diameter[1] in the rope, except for galvanizing tests where the number of wires taken shall be 10 percent of the total number of the same nominal diameter.

In order to obtain test pieces, a suitable length shall be cut from the rope and the wires unlaid Wires of equal nominal diameter shall be thoroughly mixed and the appropriate number of wires selected at random

5.2.2 *Measurement of Wire Diameter*

The actual diameter of the steel wire shall be taken as the mean value of two measurements made in mutually perpendicular planes at the same point on the wire The actual diameter established in this way shall be within the permitted tolerance for the nominal diameter as given in **4.2.1**

5.2.3 *Wire Tensile Test*

The tensile test shall be performed in accordance with the requirements of IS 1608, but with the following modifications

a) Gauge length L_0 of the test piece shall be 50 mm, and
b) It will not normally be necessary to straighten the wires if only the tensile strength is to be tested

When tested in this manner, the wires shall comply with the values given in **4.2.2**

5.2.4 *Reverse Bend Test*

The reverse bend test shall be performed in accordance with the requirements of IS 1716

When tested in this manner the wires shall comply with the values given in **4.2.3**

5.2.5 *Torsion Test*

The torsion test shall be performed in accordance with the requirements of IS 1717 but with the following modification, the torsion test shall be continued until fracture occurs

When tested in this manner, the wires shall comply with the values given in **4.2.4**

5.2.6 *Tests on Galvanized Coating*

The tests on the galvanizing of the wires shall be performed in accordance with IS 6745 The coating shall comply with the values given in **4.2.5**

5.2.7 *Compliance with Requirements*

5.2.7.1 *Using acceptance Method A* (*see* **4.1.4.2**)

Wires from the rope comply with this standard:

a) If not more than 5 percent of all wires exceed the tolerances on diameter,
b) If not more than 3 percent of all wires are

---

[1] In some rope constructions, shaped strand centres may be made from wound wires, in these cases, the wires of the shaped components shall be disregarded

more than 50 N/mm² below the minimum values for tensile strength,

c) If not more than 5 percent of all wires fall below the minimum values for bends or torsions or both,

d) If the total percentage of all wires with these defects does not exceed 10 percent, and

e) If in addition to the above, the percentage of the wires tested that are allowed to fall below the minimum values for mass of galvanized coating is not more than 5 percent

If in any of the above-mentioned tests, a particular wire fails on more than one test, it shall be considered as one defect only

5.2.7.2 *Using acceptance Method B* (*see* **4.1.4.3**)

Wires from the rope comply with this standard

a) If not more than one wire in any diameter group fails to pass any of the tests specified, and

b) If two or more wires of any diameter group fail to pass any of the tests specified, all the remaining wires of that group in the rope shall be retested in respect of the tests in which these wires have failed, if the number of wires which fail in these new tests does not exceed 4 percent (to the nearest whole number of wires above these 4 percent) of the whole number of wires of equal nominal diameter in the rope, the rope shall be deemed to comply with this standard

5.3 Independent Tests

In the case of dispute between the manufacturer or supplier and the purchaser over any test result, the manufacturer or supplier shall have the right to have independent tests carried out by a testing authority agreed between the manufacturer or supplier and the purchaser

If the results of these tests are satisfactory, the rope shall be considered to comply with this standard

6 INSPECTION FACILITIES

6.1 When so specified by the purchaser, the manufacturer or supplier shall accord the purchaser or his representative all reasonable facilities to satisfy himself that the rope and its components are in accordance with this standard

6.2 Whenever possible and unless otherwise agreed, all tests and inspection shall be made at the manufacturer's works before despatch

6.3 When tests are carried out at the manufacturer's works, he shall supply all the necessary test pieces, apparatus and labour and the testing shall be up to the satisfaction of the purchaser or his representative

7 CERTIFICATES

7.1 General

The types of certificate described in **7.2** to **7.4** are recognized The certificates required by the purchaser shall be stated in the purchaser's order

7.2 Works Certificate

With this certificate the manufacturer or supplier acknowledges the conditions as specified in the purchaser's order (*see* Annex A)

7.3 Full Works Certificate

The full works certificate gives the results of the tests requested by the purchaser in his order (*see* Annex B)

7.4 Certificate of Acceptance

In particular cases, when requested by the purchaser, tests may be undertaken after manufacture, in the presence of the purchaser or his representative The test results are laid down in the certificate of acceptance, which is equivalent to the full works certificate

8 PACKING

Ropes shall be supplied on reels The ropes shall be protected, in transit, against damage by moisture, dust or dirt

ANNEX A

(*Clause* 7.2)

EXAMPLE OF A WORKS CERTIFICATE FOR STRANDED WIRE ROPES

(This Annex does not form an integral part of the standard)

WORKS CERTIFICATE

Manufacturer or supplier . . . .

Commission number . . . . .

Purchaser . . . .

Purchaser's order number . . . .

Date of delivery . . . .

Nominal diameter . . . . . . mm

Length . . . . m

Construction . . . .

Type and direction of lay . . . .

Tensile grade . . . . N/mm^2

Surface finish of wires . . . .

Nominal aggregate breaking force/minimum breaking force . N

Rope mass per metre . kg/m

Total mass of the rope . . . . . kg

Reel number . . .

Remarks . . .

It is certified that the above-mentioned rope conforms to IS 13917

Place, Date Signature (Stamp)

ANNEX B

(*Clause* 7.3)

EXAMPLE OF A FULL WORKS CERTIFICATE FOR STRANDED WIRE ROPES

(This Annex does not form an integral part of the Standard.)

FULL WORKS CERTIFICATE

Manufacturer or supplier

Commission number

Purchaser

Purchaser's order number

Date of delivery

1 SPECIFICATIONS OF THE ROPE

Terms of delivery

Nominal diameter of the rope mm

Measured diameter of the rope mm

Order length of the rope m

Measured length of the rope m

Total mass of the rope kg

Nominal rope mass per metre kg/m

Actual rope mass per metre kg/m

Construction

Type and direction of lay

Length of lay mm

Surface finish of wires

Is rope preformed/postformed? Yes/No

Nominal tensile grade N/mm^2

Nominal aggregate breaking force/minimum breaking force N

Measured aggregate breaking force/measured breaking force N

Material of core

Type of lubricant of strands

Type of impregnating compound of fibre inserts

Percentage of impregnating compound in the fibre inserts and cores, with respect to the mass of the dry fibre

Reel number

Dimensions of reel (diameter × width) m × m

Total mass of reel and packing and rope kg

2 TEST RESULTS ON SINGLE WIRES

Number of the Wire	**Diameter**		**Breaking Force**	**Tensile Strength**	**Number of Bends**	**Number of Torsions**	**Surface Density of Zinc**
	nominal mm	measured mm	N	N /mm^2			g /m^2

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